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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,531	04/24/2001	Bruce B. Doris	FIS9-2001-0002	5917

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EXAMINER	
MALDONADO, JULIO J	
ART UNIT	**PAPER NUMBER**
2823	4

DATE MAILED: 03/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/841,531	DORIS ET AL.	
	Examiner	Art Unit	
	Julio J. Maldonado	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 April 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 2-3, 9, 12-13 and 19 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. On page 11, lines 5-20 of the specification cite that the concentration of germanium is higher in the lower layer (3a) than in the upper layer (3b) since the etch rate of the Si-Ge layer increases with the concentration of germanium. However, on claims 2-3, 9, 12-13 and 19 cite that the lower layer comprises only polysilicon and amorphous silicon and that amorphous silicon is devoid of germanium.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4-6, 11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuta (U.S. 4,845, 534) in view of Chau et al. (U.S. 6,326,664) and the applicants admitted prior art.

In reference to claims 1 and 11 Fukuta (Fig.1-8) shows a field effect semiconductor device having a substrate (11); a T-shaped gate (16) above said substrate (11), said notch-shaped gate conductor (16) comprising at least two layered sections, including an upper layer (16b) and a lower layer (3a); that the layered sections comprises Ti-W silicide with a greater W concentration greater on the lower layer (16a); and said lower layer (16a) has a higher etch rate than said upper layer (16b).

However, Fukuta does not show a semiconductor device having layers comprising silicon-germanium or amorphous silicon. However, Chau et al. shows a CMOS device having a gate conductor material (314) comprising silicon-germanium.

It would have been obvious to incorporate layer (314) of Chau et al. into the device of Fukuta for an expectation of success. The motivation/suggestion would be that germanium shows good selectivity to silicon making it manufacturable (column 5, lines 40-44). Furthermore, silicon-germanium alloys exhibits dislocations which aids in the in the diffusion of dopants through the semiconductor material (column 5, lines 44-47).

Still, Fukuta do not teach having a substrate with source and drain regions; a gate insulator above said substrate; a notch gate conductor above said gate insulator; doping said notch-shaped conductor and said substrate, to make said notch-shaped conductor conductive, and to form source and drain regions in said substrate.

Nevertheless, the admitted prior art teaches the formation of T-shaped and notch-shaped semiconductor devices including forming gate insulators; depositing gate

conductor materials including polysilicon; and doping said conductor materials and said substrate to form source and drain regions (page 1, line 8 – page 3, line 3).

It would have been obvious to one of ordinary skill in the art to include the teachings of the admitted prior art into those of Fukuta to arrive to the claimed invention. The motivation/suggestion would be that the basic process for the formation of CMOS circuit device includes the formation of gate oxides over a substrate, forming T-shaped and notch-shaped gates over said oxide and doping said gate and said substrate (page 2, line 13 – page 3, line 14).

In reference to claim 4-5 and 14-15 Fukuta in combination with Chau et al. teaches that said lower layer and said upper layer comprise polysilicon-germanium having concentrations of germanium that increase along a depth of said upper layer section and said lower layer section.

In reference to claim 6 and 16 Fukuta teaches that said upper and lower layer comprise materials capable of being simultaneously etched (column 6, lines 7-21).

5. Claims 2-3, 7-10, 12-13 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuta ('534), Chau et al. ('664) and the admitted prior art as applied to claims 1 and 11 above, and further in view of Possin et al. (U.S. 5,010,027).

In reference to claims 2-3, 7-9, 12-13 and 17-19 Fukuta in view of Chau et al. teaches all aspects of the invention but fails to teach that the lower layer comprises amorphous silicon and polysilicon. Nevertheless, Possin et al. in an analogous method for the formation of conductive layers teaches a conductive layer (18) that can comprise amorphous silicon, amorphous germanium or polysilicon.

It would have been obvious to one of ordinary skill in the art to include the teachings of Possin et al. into the invention of Fukuta for an expectation of success. The motivation/suggestion would be that those materials are well-known in the art and the selections of such materials are common in the art.

In reference to claims 10 and 20 Fukuta teaches that said upper and lower layer comprise materials capable of being simultaneously etched (column 6, lines 7-21).

Conclusion

6. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432** . The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

8. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

9. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/283, 257/344, 438/159	02/23/2002
Other Documentation:	
Electronic Database(s): EAST (USPAT, US-PGPUB, EPO, JPO, DERWENT, IBM)	02/23/2002

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